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09/471,981	12/23/1999	EMIKO IGAKI	MTS-3181US	8182

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EXAMINER

TRAN, LY T

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/471,981

Applicant(s)

IGAKI ET AL.

Examiner

Ly T TRAN

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,39-63,65-69 and 71-82 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,39-50,58,60-63,71,76 and 81 is/are rejected.
- 7) ☒ Claim(s) 51-57,59,65-69,72-75 and 77-80 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "electrode has a mesh like structure" (Claim 60) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4, 5, 40, 41 and 43 are rejected under 35 U.S.C. 102b as being anticipated by Bartky et al. (USPN 5,003,679).

With respect to claim 1, Bartky et al. discloses an recording head comprising:

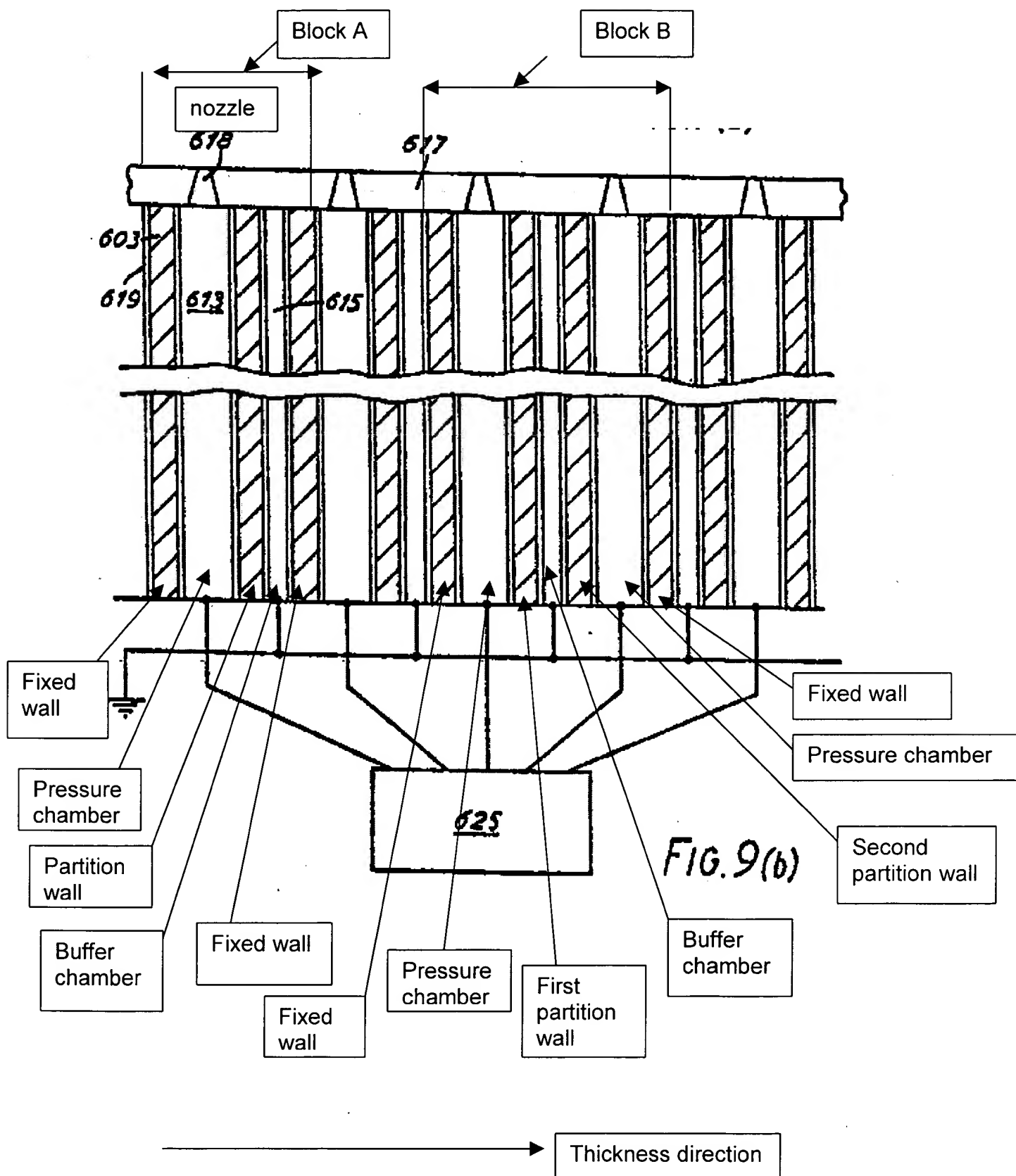
- One piezoelectric block having an ink pressure chamber (Fig.9b: element 613) communicating with a nozzle (element 618) for ejecting ink, a partition wall serving as a driving portion that includes a piezoelectric element, a pressure buffer chamber (element 615) and two fixed wall (Fig.9b)
- Ink pressure chamber, partition wall and pressure buffer chamber are respectively arranged in sequence along a thickness direction of piezoelectric block
- One of fixed walls is disposed adjacent to the ink pressure chamber and another fixed wall is disposed adjacent to the pressure buffer chamber (Fig.9b)

With respect to claim 4, Bartky et al. discloses an recording head comprising:

- One piezoelectric block (A) as shows in figure 9b, having an ink pressure chamber (A) communicating with a nozzle (A) for eject ink, a partition wall (A) serving as a driving portion that includes a piezoelectric element and at least tow electrodes (A) for driving the piezoelectric (A), a pressure buffer chamber (A) and two fixed walls (A),
- One piezoelectric block (B) as shows in figure 9b, having first and second ink pressure chamber (B) communicating with a nozzle (A) for eject ink, first and second partition wall (B) serving as a driving portion for one of the two ink pressure chamber, each partition wall includes a piezoelectric

element and at least two electrodes (B) for driving the piezoelectric (B), a pressure buffer chamber (B) and first and second fixed walls (B),

- Wherein the piezoelectric block (A) configured such that Ink pressure chamber (A), partition wall (A) and pressure buffer chamber (A) are respectively arranged in sequence along a thickness direction of piezoelectric block,
- One of the fixed walls (A) is disposed adjacent to the ink pressure chamber (A) and another fixed wall is disposed adjacent to the pressure buffer chamber (A),
- Wherein the piezoelectric block (B) configured such that Ink pressure chamber (B), partition wall (B) and pressure buffer chamber (B) are respectively arranged in sequence along a thickness direction of piezoelectric block,
- One of the fixed walls (B) is disposed adjacent to the first ink pressure chamber (B) and another fixed wall is disposed adjacent to the second pressure chamber (B)



Claims 5, 40, 41 and 43 are directed to how the recording head is produced. So the method claims are not further limit the apparatus claim.

4. Claims 3, 39, 42, 44-50, 58, 61-63, 71, 76 and 81 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's Admitted Prior Art (AAPA).

AAPA discloses in figure 17:

- an ink-jet recording head comprising at least one piezoelectric block (B);
- Each piezoelectric block (B) has first and second ink pressure chambers (106);
- each pressure chamber communicating with a nozzle (107) first and second partition walls (Fig.17);
- each partition wall serving as a driving portion for one of the ink pressure chambers, each partition wall including a piezoelectric element and two electrodes ((Fig.17) for driving said piezoelectric element;
- a pressure buffer chamber (108) and first and second fixed walls (Fig.17);
- The first fixed wall, the first ink pressure chamber, the first partition wall, the pressure buffer chamber, the second partition wall, the second ink pressure chamber, and the second fixed wall are arranged in sequence along a thickness direction (Fig.17) and surface of the electrodes are oriented perpendicular to the thickness direction, the driving portion is polarized in the thickness direction and perpendicular to the surfaces of the electrodes (Fig.17), at last one electrodes (103) for controlling, by

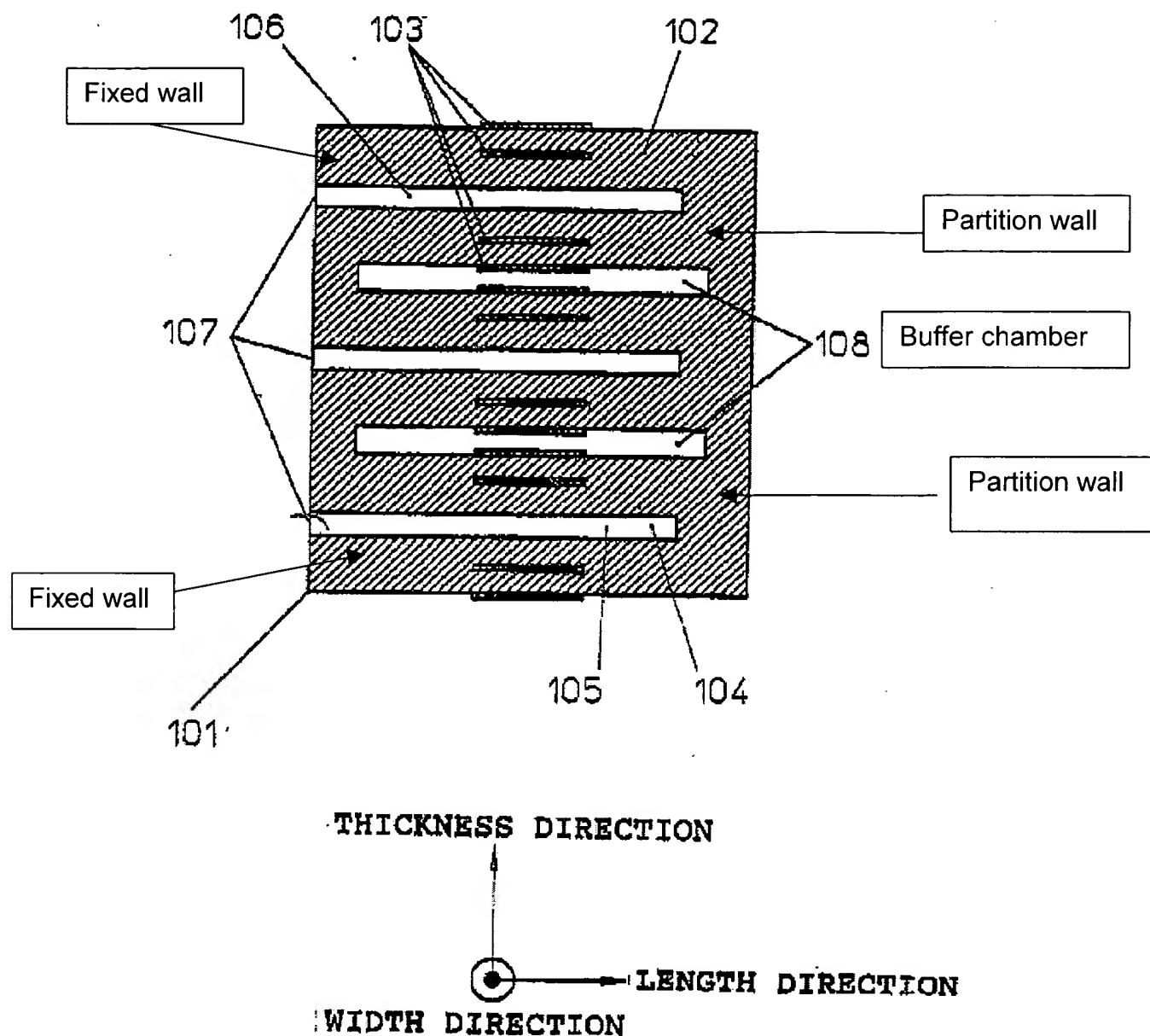
bending of the electrode, whether the partition wall bend toward a side of the ink pressure chamber or bends towards a side of the pressure buffer

- at least one of the electrodes is embedded in the wall (103);
- a plurality of these blocks, arranged in the thickness direction.
- the pressure buffer chambers are all closed on a side at which the nozzle communicating with the ink pressure chamber is open (see Fig. 4).
- there are two electrodes per partition wall, one of which is exposed to the pressure buffer and the other exposed to the ink pressure chamber;
- a portion at which the electrodes on a partition wall face each other is included in a portion at which the ink pressure chamber and pressure buffer chamber face each other (Fig.17);
- the piezoelectric block is an integrally sintered one piece block structure;
- the distance between nozzles appears to be constant (Fig.17).

Claims 39, 42, 45-50 are directed to how the recording head is produced. So the method claims are not further limit the apparatus claim.



Art Unit: 2853



### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2853

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Applicant's Admitted Prior Art (AAPA).

AAPA discloses the claimed invention except for the electrode has a mesh-like structure. It would have been obvious to one having ordinary skill in the art to have the electrode has a mesh like structure or any shape for the same purpose such as driving the piezoelectric element, since it has been held that changing the shape of an invention involves only routine skill in the art. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

#### ***Allowable Subject Matter***

6. Claims 51-57, 59, 65-69, and 72-75, 77-80 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for indication of allowable subject matter: each of the below limitations in combination as claimed cannot be made inherent or obvious by the prior art of record:

- a length of the fixed walls in the thickness direction is greater than that of the partition walls in the thickness direction (claims 51 and 53).

- each of the fixed walls includes a portion firmer than the partition wall (claim 55).
- each of fixed walls includes a hollow portion (claim 57).
- the pressure buffer chamber to communicate with an air inlet/outlet path connected outside of the recording head (Claim 59).
- both electrodes to be embedded inside the partition wall (claims 65-67).
- one electrode to be further disposed between the two electrodes (claim 68).
- the electrode at the surface exposed to the ink pressure chamber (claim 69).
- a length of one of the electrodes in a direction perpendicular to the thickness direction to be different from a length of the other electrode adjacent to said one electrode in the same direction (claim 72).
- a length of the ink pressure chamber in a direction perpendicular to the thickness direction to be different from a length of the pressure buffer chamber in the same direction (claim 75).
- nozzles are aligned without any overlapping in the direction perpendicular to the moving direction, and  $X=P/m$  Wherein X presents a deviation between the nozzles nearest each other out of the nozzles in reference to the moving direction, m presents an integer number of nozzles, and P presents a distance between the nozzles belonging to the same nozzles alignment (Claims 77-80).

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ly T TRAN whose telephone number is 703-308-0752. The examiner can normally be reached on M-F (7:30am-5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 703-3082847. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0967.



May 20, 2003



JUDY NGUYEN  
PRIMARY EXAMINER